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Sheet material handling system, and dispenser and winding apparatus for use therein.

A dispenser for plastics film material comprises a base (10) with a handle (12). A mandrel assembly (16) is removably fitted in a socket (14) on the base (10), and includes a central part (22) holding a reel (24) of film. The central part (22) is rotatable with respect to the remainder of the assembly (16) to allow the film (24) to unreel. Adjustable braking means are provided to give a preselected degree of resistance to unreeling.

The dispenser forms part of a packaging system which also includes a winding apparatus

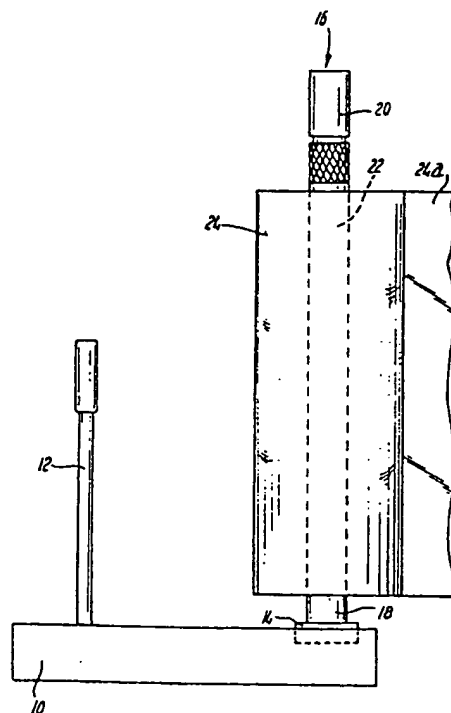


Fig. 1

EP 0 300 695 A2

"Sheet Material Handling System, and dispenser and winding apparatus for use therein"

This application relates to a system for handling sheet materials in roll form, and particularly (but not exclusively) plastics stretch film; and to a dispenser and a winding apparatus for use in the system.

Plastics stretch film is widely used in industry as a means of packaging material loaded on pallets. The plastics material is supplied on large bulk rolls which has to be converted onto small rolls before use. On application, the plastics should be stretched so that it wraps tightly against the material being packaged.

A number of problems exist for the average user. The machine required for converting the plastics film from large bulk rolls to the smaller rolls is too expensive for most users who thus have to buy in the smaller rolls already converted. This increases cost because of the need to pay for the conversion to be carried out. It also introduces the possibility of wastage as the nature of the plastics film is such that it is extremely difficult to tell if the small roll has a shorter length of film on it than specified. A further problem is that when the plastics film is used in packaging by hand it may be inadequately stretched which has the effect of providing a less secure package than is possible and also leads to a certain amount of wastage.

Accordingly, the present invention in one aspect provides apparatus for dispensing sheet material from a roll, comprising a generally cylindrical body having a first portion for mounting said roll, and a second portion extending therefrom; the first and second portions being arranged for relative rotational motion; and means being provided for resisting said relative rotation.

This allows wrapping by hand with a controlled tension and thus a controlled degree of stretch.

Preferably, means are provided for adjusting the degree of resistance.

From another aspect, the invention resides in an apparatus for use in winding plastics material films onto a reusable and/or tensionable core, comprising means for receiving a bulk roll of film for rotation, means for receiving the reusable and/or tensionable core onto which the film is to be wound, and means being provided for driving the core for winding the film thereon.

Further the invention provides a system for handling sheet materials supplied in bulk roll form, comprising a plurality of cores, an apparatus in accordance with the preceding paragraph for winding the material from the bulk roll onto said cores in shorter lengths, and one or more dispensers for dispensing material from the cores under controlled tension.

Said core may be a reusable sleeve for mounting on a dispensing apparatus as defined above, or may be constituted by that apparatus itself.

The handling system of the invention allows a small user to combine hand wrapping with bulk supply in an economical manner.

Embodiments of the invention will now be described, by way of example only, with reference to the drawings, in which;

Fig. 1 is a side view of a dispenser forming one embodiment of the invention ready for use;

Fig. 2 is a detailed cross-sectional side view of a mandrel assembly forming part of the dispenser of Fig. 1;

Figs 3 and 4 are cross-sectional side views illustrating alternative forms of mandrel assembly;

Fig. 5 is a schematic side view of one embodiment of winding apparatus in accordance with the present invention; and

Fig. 6 is a side view illustrating the path taken by the film through the winding apparatus.

Referring to Fig. 1, the dispenser comprises a base 10 having an upstanding handle 12 by means of which the dispenser can be moved by a user. The base is provided with a socket 14 in which a mandrel assembly designated generally at 16 can be removably fitted. The mandrel assembly 16 includes a bottom section 18 for securement in the socket 14, a handle portion 20 at the opposite end, and a central part 22 on which is reeled a plastics stretch film 24. As will be described, the central part 22 is rotatable with respect to the remainder of the mandrel assembly 16 but such rotation is restrained by a variable braking force; this allows the film 24 to be unreeled as indicated at 24a with a chosen degree of tension.

The mandrel assembly 16 is shown in detail in Fig. 2. A shaft 26 runs centrally of the assembly. The handle portion 20 comprises a tubular member 28 rotatable with respect to the shaft 26 by means of bearing bushes 30, 32 mounted in end cap 34 and spacer 36. The bottom portion 18 comprises a tubular member 36 rotatable with respect to the shaft 26 via bearing bush 38 mounted in end cap 40. A shaft support 42 and a steel bolt member 44 (to be discussed below) are bonded to the tubular member 36.

The central part 22 of the mandrel assembly 16 comprises a tubular member 46, on which the film (not shown) is reeled, mounted for rotational and axial movement with respect to the shaft 26 by bearing bushes 48 via spacers 50, 51. The spacers have rings of friction braking material 52, 53 secured to their axially outer faces.

Manually operable tension adjusting means,

designated generally at 54 and 56, are provided on either side of the central part 22.

The first tension adjusting means 54 comprises an externally knurled ring 58 bonded to a cap-shaped steel thrust nut 60 which is internally threaded to engage an external thread of the bolt member 44. The bolt member 44 is fast with the shaft 26 by means of a lock pin 62. A set of spring washers 64 is trapped between the end face of the thrust nut 60 and a thrust pad 66 bearing against the friction ring 53. The thrust pad 66 is axially slidable on the shaft 26 but is restrained from rotation on it by a dowel pin 68 engaging in slots in the thrust pad 66.

The second tension adjusting means 56 comprises an externally knurled ring 70 bonded to a steel insert 72 and to a steel thrust pad 74 against which the friction ring 52 bears. The insert 72 is fast with shaft 26 by means of a lock pin 76 thus preventing rotation and axial movement of the assembly 70, 72, 74 with respect to the shaft 26.

Thus, rotation of the knurled ring 58 causes axial movement of the thrust nut 60 with respect to the shaft 26 to alter the axial length of the spring washers 64 and hence the axial force applied to the friction rings 52, 53 to alter the rotational resistance of the central part 22. This can equally be adjusted by rotating the knurled ring 70 which causes rotation of the shaft 26 with respect to the handle and bottom portions 18, 20 which in turn rotates the bolt member 44 to produce axial movement of the thrust nut as before.

It will be understood that the mandrel assembly of Fig. 2 may in fact be fitted to the base in either direction.

Referring now to Fig. 3 of the drawings, another embodiment of mandrel assembly is in the form of a cylindrical body shown generally at 101 comprising a first handle portion 102, a second dispensing portion 103 and a third adjuster portion 104. A central axle 105 is fixed to an end plate 106 of the handle portion 102 and extends through bearing plates 107, one at the opposite end of the handle portion 107, one at each end of the dispenser portion 103 and one at one end of the adjuster portion 104 to a support plate 108 at the opposite end of the adjuster portion 104.

A sleeve 109 is fitted over the axle 105 and keyed to it at 110. The sleeve 109 has a threaded end portion 111 which extends into the adjuster 104 and is engaged by an adjustment nut 112 which is fixed to the adjuster 104.

A lever 113 to which a brake pad 114 is attached pivots on the axle 105 at 115 and extends through an aperture in the sleeve 109. A portion of the sleeve 109 forms a cam 116 which engages the lever 113. A spring 117 is fixed on the sleeve 109 and urges the lever 113 against the cam 116.

In use a quantity of sheet material such as plastics stretch film is wound onto the dispensing portion 103. A user can then unwind the material from the dispensing portion 103 and wrap it around a package to be wrapped. The mandrel assembly may be used with the base 10 of Fig. 1. Alternatively, the user may hold the assembly by the handle portion 102 and the dispensing portion 103 rotates on the axle 105 to unwind the material. However, the brake pad 114 resists the rotation of the dispensing portion 103 and thus the material is tensioned as it is unwound and, in the case of plastics stretch film, stretched. The degree of resistance presented by the brake pad 114 can be adjusted by rotating the adjuster 104 which causes the adjuster nut 112 to rotate on the threaded end portion 111 of the sleeve 109 which thus moves along the axle 105 to cause the cam 116 to move against or away from the lever 113. This causes the brake pad 114 to bear more or less against the dispensing portion 103.

Another alternative embodiment is illustrated in Fig. 4. This embodiment is essentially similar in function to the embodiment of Fig. 3 and like parts are accorded like reference numerals. This embodiment, however, is designed to accommodate a quantity of sheet material which has already been wound onto a tubular former 118. In this case the dispensing portion 103 is modified to receive this former 118 by substituting two of the bearing plates 107 with retaining plates 119 and 120 which each have a wedge portion 121 which engages the former 118 to retain it on the dispensing portion 103. The plate 120 can be threaded onto the dispensing portion 103 the desired amount to grip the former 118 and the plate 119 is removable for initial fitment of the former 118.

Thus this mandrel assembly can be used with already converted rolls of material rather than being wound direct from a bulk roll.

Although the primary use of the dispenser is for dispensing plastics stretch film packaging material it can be adapted for many other uses.

Many other types of plastics material can be dispensed from the dispenser and it is envisaged, for example, that cling type film as sold in supermarkets and the like could be dispensed from the dispensers if provided with suitable fixings. A shopper could thus obtain any desired length of cling film.

Figs 5 and 6 illustrate a winding apparatus which can be used to wind film from a bulk roll onto mandrel assemblies such as those shown in Figs 2 to 4 or onto formers such as former 118 of Fig. 5.

The winding apparatus comprises a box like casing 201 which has a front closure member 202 hinged to the casing 201 at 203. A support 204 is

provided in the base of the casing 201 for receiving a bulk roll 205 of plastics material pallet wrap film. The support 204 may be slid out of the front of the casing 201 for replacement of the bulk roll 205.

An intermediate roller 206 is mounted in the casing 1 above the bulk roll 205.

A ledge 207 in the casing 201 has a pair of supports 208 for receiving a core 209 onto which film is to be wound. This core 209 is preferably of a reusable and/or tensionable type, as described above.

A pair of retaining members 210 provided with handles are pivotally mounted in the casing 1 and serve to retain the core 209 in position. A micro-switch, not illustrated, is provided and one of the retaining members 210 operates it to stop the operation of the apparatus when the core 209 and associated film reaches a desired size. A lid 211 is also provided on the casing 201 and serves to cover the core 209 in the closed position.

Drive means, in the form of an electric motor (not shown), are provided for the core 209 and an operating switch is provided on the top of the casing 201.

In use a bulk roll 205 of film is located in the apparatus and the film is passed over the intermediate roller 206 to lie on the ledge 207. A core 209 is sited on the supports 208 and retained by the retaining members 210. The end of the film is then wrapped partially around the core 209 and the front closure member 202 and lid 211 closed. The operating switch is then operated and the apparatus commences operation to wind the film onto the core 209. The diameter of the core 209 increases until the microswitch is operated to stop the machine.

The lid 21 can then be opened and the film cut to allow the now full core 209 to be removed.

This core 209 is then available for use in packaging materials using the film. While this first core 209 is being used further cores 209 can be prepared in the same fashion.

The apparatus is provided with various safety cut out devices to prevent operation when the closure member 202 and lid 211 are not closed. In addition the lid 211 cannot be closed until the retaining members 210 are correctly positioned.

Modifications and improvements may be incorporated without departing from the scope of the invention.

Claims

1. Apparatus for dispensing sheet material from a roll, comprising a generally cylindrical body having a first portion for mounting said roll, and a second portion extending therefrom; the first and

second portions being arranged for relative rotational motion; and means being provided for resisting said relative rotation.

2. Apparatus according to claim 1, in which said resisting means includes means for adjusting the degree of resistance.

3. Apparatus according to claim 2 in which the first portion is rotatable on a shaft, the second portion is secured to the shaft, and the resisting means comprises a brake extending from the shaft to engage the first portion, the adjustment means being in the form of a lever and cam arrangement.

4. Apparatus according to claim 2, in which the first portion is rotatable on a shaft, the second portion is secured to the shaft, and the resisting means comprises a brake formed between a first annular member secured to said first portion and a second annular member rotating with the shaft, resilient means being provided for urging the first and second annular members towards each other.

5. Apparatus according to claim 4, in which the adjustment means comprises a stop member, the resilient means being trapped between the stop member and the second annular member, the stop member being axially adjustable with respect to the second annular member.

6. Apparatus for use in winding plastics material films onto a reusable and/or tensionable core, comprising means for receiving a bulk roll of film for rotation, means for receiving the reusable and/or tensionable core onto which the film is to be wound, and means being provided for driving the core for winding the film thereon.

7. The apparatus of claim 6, including guards for enclosing the rolls of film when the apparatus is in operation.

8. A system for handling sheet material supplied in bulk roll form, comprising a plurality of cores, an apparatus in accordance with claim 6 for winding the material from the bulk roll onto said cores in shorter lengths, and one or more dispensers for dispensing material from the cores under controlled tension.

9. A system according to claim 8, in which said cores are reusable sleeves which may be mounted on an apparatus according to claim 1 to form said dispenser.

10. A system according to claim 8, in which said cores are apparatus according to claim 1, each dispenser comprising one of said cores.

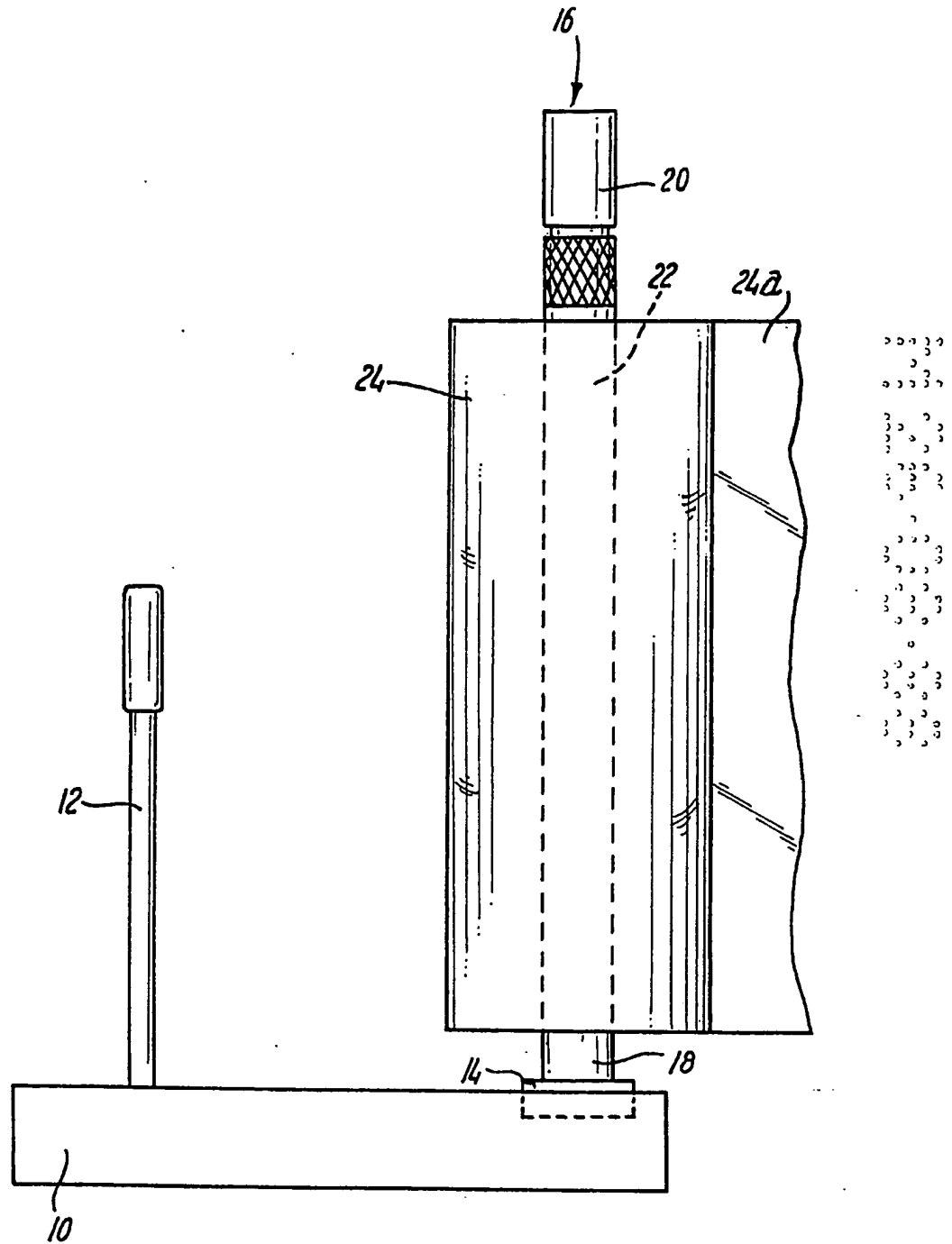
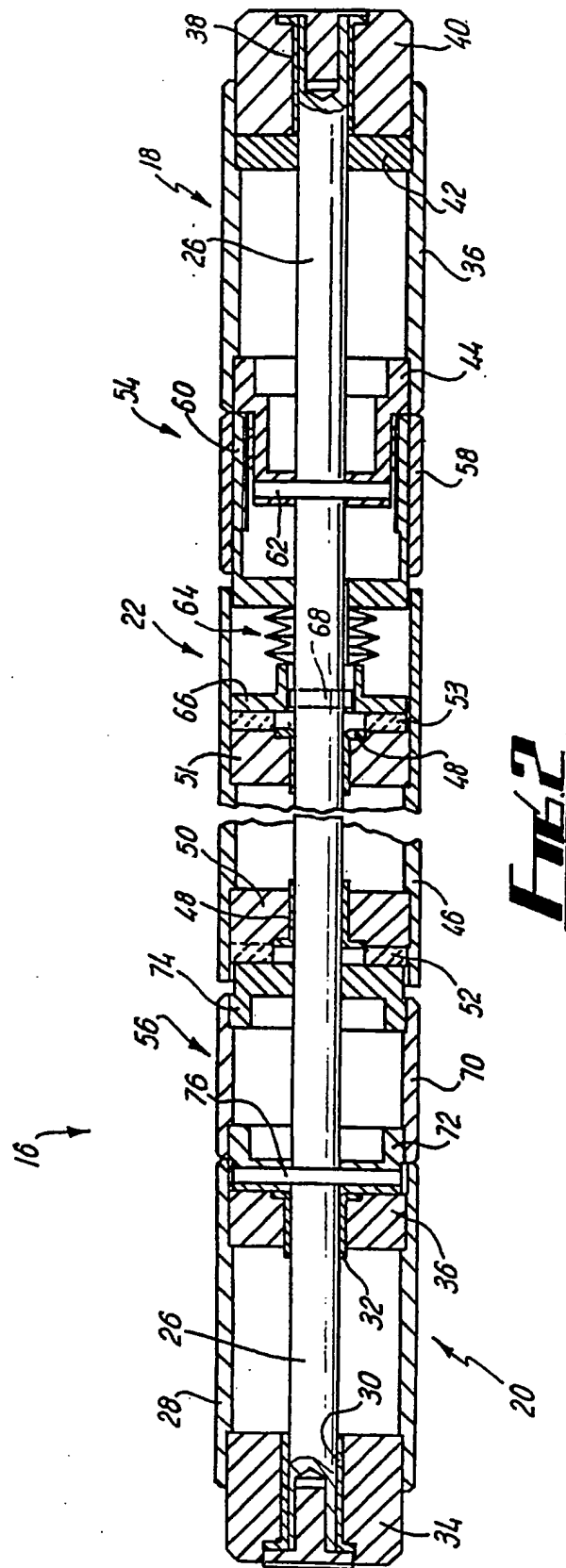


Fig. 1



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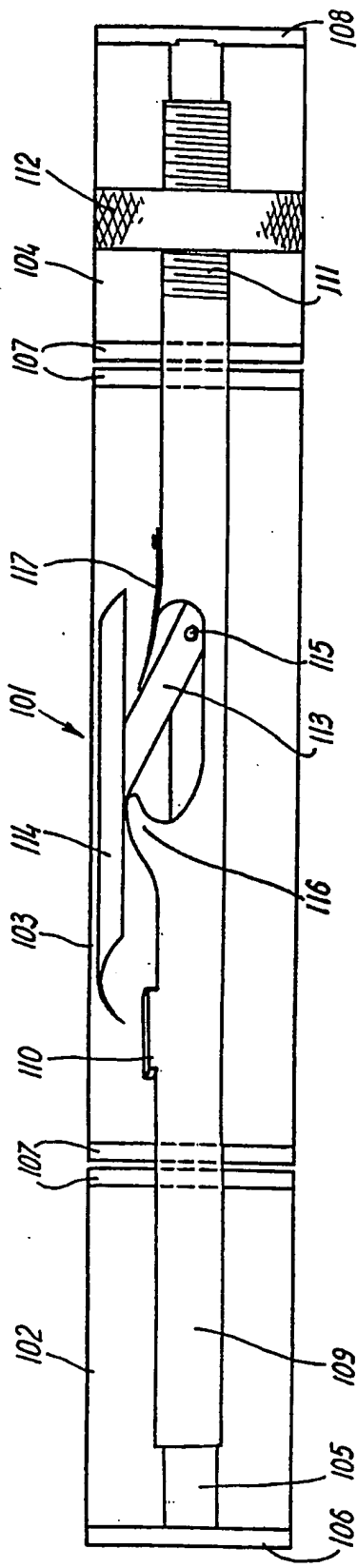


Fig. 3

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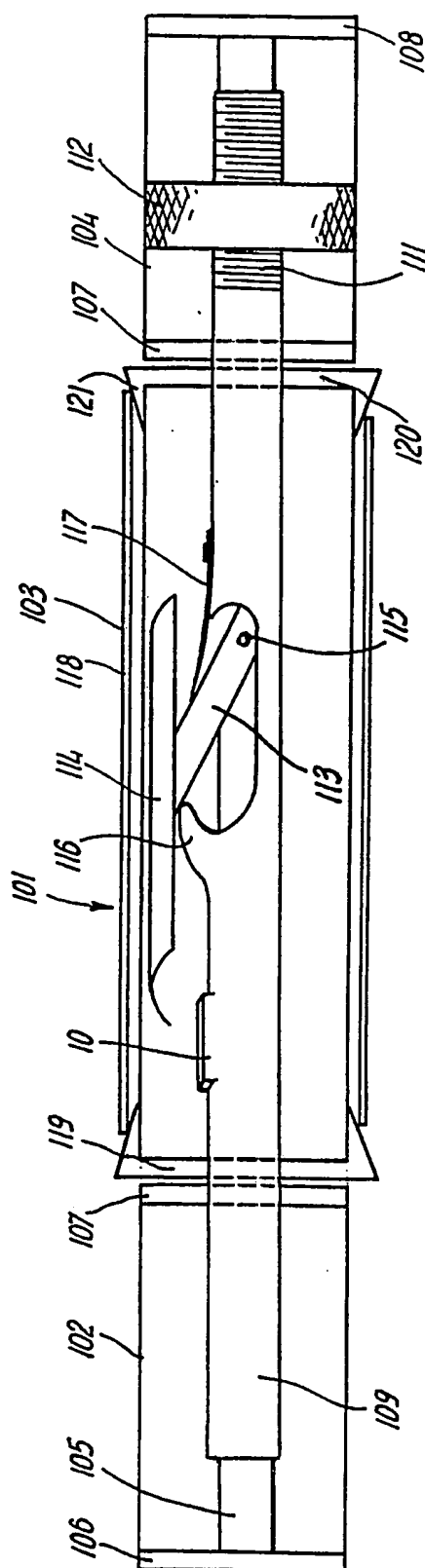
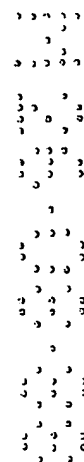


Fig 4



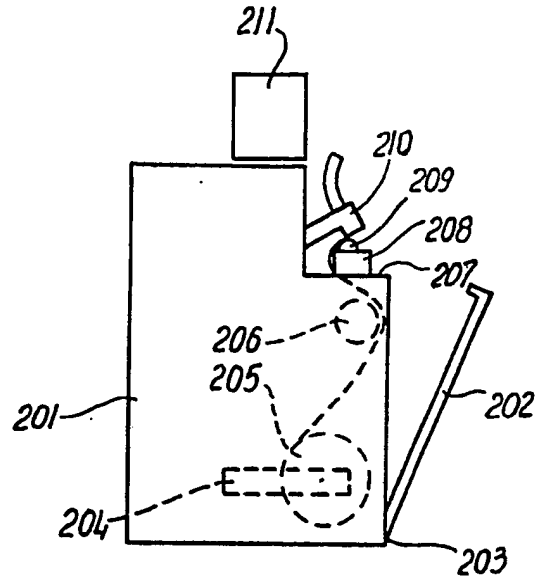


Fig. 5

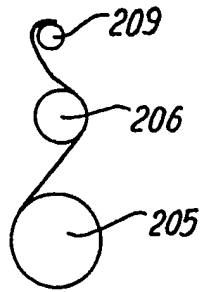


Fig. 6